

WHAT IS CLAIMED IS:

1. An AGC (automatic gain control) device in an OFDM (orthogonal frequency division multiplexing) system, comprising:

an RF (radio frequency) unit for controlling a gain of an input signal;

5 a first energy calculator for calculating an energy of the input signal;

a first accumulator for accumulating the energy calculated by the first energy calculator, finding a mean value thereof, and outputting the mean value;

a second accumulator for producing a DC offset of the input signal;

10 a second energy calculator for calculating an energy of the DC offset produced by the second accumulator;

a subtractor for subtracting the energy of the DC offset of the input signal output by the second energy calculator from the energy of the input signal output by the first accumulator; and

15 a comparator for comparing an output of the subtractor with a specific reference value established for AGC, and performing feedback of a comparison result for AGC to the RF unit.

2. The AGC device of claim 1, wherein the energy calculation for AGC is performed in a training sequence interval of the input signal.

20 3. The AGC device of claim 2, wherein the energy calculation is performed for each interval of 16 samples when the training sequence interval is a short training sequence interval.

4. The AGC device of claim 2, wherein the energy calculation is performed for each interval of 64 samples when the training sequence interval is a long training sequence interval.

5. The AGC device of claim 1, wherein the first and second energy calculators find a summation of the square of the input signal, and output a result as an energy.

6. The AGC device of claim 5, wherein the energy \hat{Energy} output by the first accumulator is given as

$$\hat{Energy} = \frac{1}{N} \sum_{n=1}^N [Si(n)^2 + Sq(n)^2] + [Di^2 + Dq^2]$$

in the case where R_i and R_q are respectively I and Q values of the training sequence input to the first energy calculator, R_i and R_q are expressed as the summation of ideal signals S_i and S_q (i.e., without DC offsets) and DC offsets D_i and D_q , a mean value of the S_i and S_q is zero in a specific interval N , and the D_i and D_q are constants.

7. The AGC device of claim 6, wherein the energy E output by the second energy calculator is expressed by the equation

$$E = D_i^2 + D_q^2.$$

8. The AGC device of claim 7, wherein the energy E output by the subtractor is expressed by the following equation and represents an ideal signal without DC offsets

$$\hat{Energy} = \frac{1}{N} \sum_{n=1}^N [Si(n)^2 + Sq(n)^2].$$

9. The AGC device of claim 1, further comprising a dB converter provided between the subtractor and the comparator, the dB converter

converting an output of the subtractor into a dB value.

10. The AGC device of claim 1, further comprising:

an A/D (analog-to-digital) converter for converting the input signal into a digital signal, and inputting the digital signal to the first energy calculator and the second accumulator; and

a D/A (digital-to-analog) converter for converting a comparison result output by the comparator into a digital signal, and outputting the digital signal to the RF unit.

11. An AGC (automatic gain control) method in an OFDM (orthogonal frequency division multiplexing) system, comprising:

(a) performing coarse AGC through a DC offset cancellation in a short training sequence interval when an input signal is detected, the AGC being performed by subtracting an energy of the DC offset from an energy of the input signal and using an energy of the DC offset cancelled ideal signal;

(b) performing a coarse frequency offset search and cancellation in the short training sequence interval;

(c) performing fine AGC through a DC offset cancellation in a long training sequence interval, the AGC being performed by subtracting the energy of the DC offset from the energy of the input signal and using the energy of the DC offset cancelled ideal signal; and

(d) performing a fine frequency offset search and cancellation in the long training sequence interval.

12. The AGC method of claim 11, wherein the AGC in (a) is performed for each unit of 16 samples in the short training sequence interval.

13. The AGC method of claim 11, wherein the AGC in (c) is performed for each unit of 64 samples in the long training sequence interval.

14. The AGC method of claim 11, wherein (b) is performed in the final three repeated intervals of the short training sequence.

5 15. In an AGC (automatic gain control) method in an OFDM (orthogonal frequency division multiplexing) system, a recording medium including a program comprising:

 (a) performing coarse AGC through a DC offset cancellation in a short training sequence interval when an input signal is detected, the AGC being
10 performed by subtracting an energy of the DC offset from an energy of the input signal and using an energy of the DC offset cancelled ideal signal;

 (b) performing a coarse frequency offset search and cancellation in the short training sequence interval;

 (c) performing fine AGC through a DC offset cancellation in a long
15 training sequence interval, the AGC being performed by subtracting the energy of the DC offset from the energy of the input signal and using the energy of the DC offset cancelled ideal signal; and

 (d) performing a fine frequency offset search and cancellation in the long training sequence interval.